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EXAMINER

SINGH, SATWANT K

ART UNIT	PAPER NUMBER
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2625

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/647,271

Applicant(s)

KAWATOKO ET AL.

Examiner

Satwant K. Singh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/17/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 13-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 13-16 are drawn to a computer code (i.e. an algorithm) not claimed as residing on a computer readable medium. Claims 13-16, while defining a computer program product does not define a "computer-readable medium" and is thus non-statutory for that reason. The examiner suggests amending the claims to embody the program on a "computer-readable medium" in order to make the claim statutory.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Fujimori (US 6,783,203).
5. Regarding Claim 1, Fujimori disclose an image printing method for completing a print process of each pixel by making a plurality of main scans of a print head, which

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prints dots on a print medium (completing dot formation on each main scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a step of assigning, to a pixel of interest (Fig. 6B, P1-P4), a pattern used to determine which of the plurality of main scans is used to print a dot to be printed for the pixel of interest (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31); and a printing step of printing a dot on the pixel of interest in the main scan determined by the assigned pattern (droplets of the small dot SD shown in FIG. 6(B), the medium dot MD shown in FIG. 6(D), and the large dot LD shown in FIG. 6(F) are ejected onto the same given main scan line) (col. 8, lines 19-31), and wherein the assignment step includes a step of selecting one pattern from a plurality of patterns (small dot, medium dot, or large dot) corresponding to each of density levels (D(S-on), D(M-on), or D(L-on)) on the basis of a density level (threshold levels Th1, Th2, or Th3) of the pixel of interest (odd numbered pixel location or even numbered pixel location), and assigning the selected pattern to the pixel of interest (set pixel pair halftone data) (Fig. 10) (col. 9, lines 62-67, col. 10, lines 1-36).

6. Regarding Claim 2, Fujimori discloses An image printing method for completing a print process of each pixel by making a plurality of scans of a print head, which prints dots on a print medium (completing dot formation on each main scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a step of assigning, to each pixel, a pattern (small dot, medium dot or large dot) which

specifies the number of dots corresponding to a density level (Fig. 8, volume of ejected ink at each pixel) of the pixel and scans used to print the dots (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31).

7. Regarding Claim 3, Fujimori discloses an image printing method for completing a print process of each pixel by making a plurality of scans of a print head, which prints dots on a print medium (completing dot formation on each main scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: an assignment step of assigning a pattern (small dot, medium dot or large dot), used to determine which of the plurality of scans is used to print a dot to be printed for each pixel, to that pixel (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31); a generation step of generating a pattern of dots to be printed in each scan of the print head on the basis of the pattern assigned to the pixel (small dots SD are produced at only one predetermined pixel position in any given pixel pair, and each of medium dots MD and large dots LD is produced at only one predetermined pixel position in any given pixel pair) (col. 8, lines 32-50); and a step of printing dots on each pixel on the basis of the generated pattern (Fig. 6, droplets of the small dot SD shown in FIG. 6(B), the medium dot MD shown in FIG. 6(D), and the large dot LD shown in FIG. 6(F) are ejected onto the same given main scan line) (col. 8, lines 19-31).

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8. Regarding Claim 4, Fujimori discloses a method, wherein a plurality of patterns (small dot, medium dot, or large dot) are prepared in correspondence with each of the density levels of the pixel (D(S-on), D(M-on), or D(L-on)), and the assignment step includes a step of selecting one of the plurality of patterns corresponding to a density level of a pixel of interest randomly or in a predetermined order in accordance with the density level of the pixel of interest (threshold levels Th1, Th2, or Th3), and assigning the selected pattern to the pixel of interest (set pixel pair halftone data) (Fig. 10) (col. 9, lines 62-67, col. 10, lines 1-36).

9. Regarding Claim 5, Fujimori discloses a method, wherein the plurality of main scans include both forward and backward scans of the print head (bidirectional printing), and a pattern corresponding to a density level of a pixel which requires to print two or more dots (Fig. 20, test pattern includes five linear sub-patterns) is defined so that dots to be printed are distributed to both the forward and backward scans (each sub-pattern is composed of an upper line portion UL recorded during the forward passes, and a lower line portion LL recorded during the reverse passes) (col. 14, lines 23-39).

10. Regarding Claim 6, Fujimori discloses a method, wherein the plurality of scans include both forward and backward scans of the print head (bidirectional printing), and the pattern is defined so that dots to be printed are distributed to one of the forward and backward scans (each sub-pattern is composed of an upper line portion UL recorded during the forward passes, and a lower line portion LL recorded during the reverse passes) (col. 14, lines 23-39).

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11. Regarding Claim 7, Fujimori discloses a method, wherein the plurality of patterns corresponding to each of density levels that the pixel can assume are assigned so that densities printed in forward scans become equal to densities printed in backward scans (relative correction value for the forward pass can be used for the reverse pass as well) (col. 14, lines 3-22)

12. Regarding Claim 8, Fujimori discloses an image printing method for completing a print process of each pixel by making a plurality of scans of a print head, which prints dots on a print medium (completing dot formation on each main scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a step of assigning a pattern (small dot, medium dot or large dot), used to determine which of the plurality of main scans is used to print a dot to be printed for each pixel (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31), to that pixel (small dots SD are produced at only one predetermined pixel position in any given pixel pair, and each of medium dots MD and large dots LD is produced at only one predetermined pixel position in any given pixel pair) (col. 8, lines 32-50).

13. Regarding Claim 9, Fujimori discloses an image processing method for completing a print process of each pixel by making a plurality of main scans of a print head, which prints dots on a print medium (completing dot formation on each main scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a step of assigning, to a pixel of interest (Fig. 6B, P1-P4), a pattern used to

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determine which of the plurality of main scans is used to print a dot to be printed for the pixel of interest (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31, and wherein the assignment step includes a step of selecting one pattern from a plurality of patterns corresponding to each of density levels that the pixel (D(S-on), D(M-on), or D(L-on)) can assume in correspondence with a density level of the pixel of interest (threshold levels Th1, Th2, or Th3), and assigning the selected pattern to the pixel of interest (set pixel pair halftone data) (Fig. 10) (col. 9, lines 62-67, col. 10, lines 1-36).

14. Regarding Claim 10, Fujimori discloses an image processing method for completing a print process of each pixel by making a plurality of scans of a print head, which prints dots on a print medium (completing dot formation on each main scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a step of assigning, to each pixel, a pattern (small dot, medium dot or large dot) which specifies the number of dots corresponding to a density level of the pixel (Fig. 8, volume of ejected ink at each pixel) and scans used to print the dots (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31).

15. Regarding Claim 11, Fujimori discloses a printer for forming one pixel by one or a plurality of dots printed by a predetermined number of head scans (completing dot

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formation on each mail scan line in several main scan passes) (col. 7, lines 59-67), comprising: a memory for storing one or a plurality of patterns (Fig. 5, RAM 112) (storing waveform data that indicates the waveform of the common drive signal) (col. 7, lines 3-27), each of which indicates an order of scans that print dots for respective pixel values (common drive signal generator circuit is capable of selecting and generating, for each main scan, one of a number of common drive signal types having mutually different waveforms) (col. 7, lines 3-27); a generator (common drive signal generator circuit 110) for selecting one pattern from the one or plurality of patterns stored in said memory in accordance with a value of a pixel of interest, and generating binary data to be printed for respective scans (common drive signal generator circuit is capable of selecting and generating, for each main scan, one of a number of common drive signal types having mutually different waveforms) (col. 7, lines 3-27); and print means (Fig. 3, printer 20, focusing on the control circuit 40) for controlling the head to print dots for respective scans of the head in accordance with the binary data (control circuit comprises a head driver circuit for driving the print head unit to eject ink) (col. 6, lines 30-45).

16. Regarding Claim 12, Fujimori discloses an image recording apparatus for completing a print process of each pixel by making a plurality of main scans of a print head, which prints dots on a print medium (completing dot formation on each mail scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a memory for storing a plurality of patterns (Fig. 5, RAM 112) (storing waveform data that indicates the waveform of the common drive signal) (col. 7, lines 3-

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27), each of which specifies the number of dots corresponding to a density level of a pixel, and scans used to print the dots (common drive signal generator circuit is capable of selecting and generating, for each main scan, one of a number of common drive signal types having mutually different waveforms) (col. 7, lines 3-27); assignment means for selecting a pattern corresponding to a density level of a pixel of interest from the plurality of patterns stored in said memory, and assigning the selected pattern to the pixel of interest (common drive signal generator circuit is capable of selecting and generating, for each main scan, one of a number of common drive signal types having mutually different waveforms) (col. 7, lines 3-27); and printing control means (control circuit 40) for printing dots on the pixel of interest by the scan specified by the assigned pattern (control circuit comprises a head driver circuit for driving the print head unit to eject ink) (col. 6, lines 30-45).

17. Regarding Claim 13, Fujimori discloses a computer program product for making a computer generate data to be used in a printer for completing a print process of each pixel by making a plurality of scans of a print head, which prints dots on a print medium (completing dot formation on each main scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a code of an assignment step of assigning a pattern (small dot, medium dot or large dot), used to determine which of the plurality of scans is used to print a dot to be printed for each pixel, to that pixel (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31); and a code of a

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generation step of generating a pattern of dots to be printed for respective scans of the print head on the basis of the assigned pattern (small dots SD are produced at only one predetermined pixel position in any given pixel pair, and each of medium dots MD and large dots LD is produced at only one predetermined pixel position in any given pixel pair) (col. 8, lines 32-50).

18. Regarding Claim 14, Fujimori discloses a program product, wherein the code of the assignment step includes a step of selecting one of patterns (small dot, medium dot, or large dot) corresponding to a density level pixel (D(S-on), D(M-on), or D(L-on)) of a pixel of interest (threshold levels Th1, Th2, or Th3), and assigning the selected one pattern to the pixel of interest (set pixel pair halftone data) (Fig. 10) (col. 9, lines 62-67, col. 10, lines 1-36).

19. Regarding Claim 15, Fujimori discloses a program product, wherein a plurality of patterns (small dot, medium dot, or large dot) are prepared in correspondence with each of the density levels of the pixel (D(S-on), D(M-on), or D(L-on)), and the code of the assignment step includes a step of selecting one of the plurality of patterns corresponding to a density level of a pixel of interest randomly or in a predetermined order in accordance with the density level of the pixel of interest (threshold levels Th1, Th2, or Th3), and assigning the selected pattern to the pixel of interest (set pixel pair halftone data) (Fig. 10) (col. 9, lines 62-67, col. 10, lines 1-36).

20. Regarding Claim 16, Fujimori discloses a computer program product for making a computer generate data to be used in a printer for completing a print process of each pixel by making a plurality of scans of a print head, which prints dots on a print medium

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(completing dot formation on each mail scan line in several main scan passes) (col. 7, lines 59-67), with respect to the print medium, comprising: a code of a step of assigning, to each pixel, a pattern (small dot, medium dot or large dot) which specifies the number of dots corresponding to a density level (Fig. 8, volume of ejected ink at each pixel) of the pixel and scans used to print the dots (first main scan pass for ejecting small ink droplets is referred to as "Pass 1"; the second main scan pass for ejecting medium ink droplets as "Pass 2", and the third main scan pass for ejecting large ink droplets as "Pass 3") (col. 8, lines 19-31).

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matsubara et al. (US 5,831,642) discloses an ink jet recording method and apparatus for thinning out image data by using thinning patterns.

Nakano et al. (US 6,053,596) discloses an ink-jet printing device including a recording head driven by a driving voltage waveform in a main scanning direction for recording an image on a recording medium fed into the printing device in a subscanning direction.

Matsumoto et al. (US 6,412,902) discloses an ink jet printer including an ink jet printing head, having plural recording elements arranged in a main scan direction.

Tayuki et al. (US 6,412,909) discloses printing device wherein a head comprising a plurality of nozzles at a predetermined pitch is used for repeated primary scanning and sub-scanning to print images.

Hickman (US 6,457,806) discloses microstepping a print media transport in an ink-jet hard copy apparatus.

Yoshioka (US 6,561,423) discloses a method and apparatus for generating optically readable dot image data and recording medium.

Sato et al. (US 6,712,441) discloses a printing apparatus and method implementing smooth outline.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satwant K. Singh whose telephone number is (571) 272-7468. The examiner can normally be reached on Monday thru Friday 8am - 4:30pm.

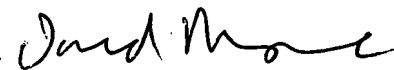
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (571) 272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


sks

Satwant K. Singh
Examiner
Art Unit 2625



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